



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Our group details

Irina Muntean	Vladimir Krasimirov Totev	Taiwo Dorcas Oladipo Bright	Madalina-Elena Caliniuc	Alina Jubea
Student ID 2023151	Student ID 2024467	Student ID 2020826	Student ID 2021819	Student ID 2023149

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Lecturer: Modak Koushik

Advances of Modern Technology National Rail An Introduction Irina Muntean

The railway system in Great Britain is the oldest railway system in the world

In 2016, there were 1.718 billion journeys on the National Rail network, making the British network the fifth most used in the world

Wikipedia (n.d.)

Who is National Rail and what are their goals and objectives?

National Rail is owned by Rail Delivery Group

It was introduced in 1999

Related brands are British Rail · National Rail Corporation · Rail Delivery Group

Rail Delivery Group (n.d.)

Objectives

"Our role is to run a safe, reliable and efficient railway, serving customers and communities.

We exist to get people and goods where they need to be and to support our country's economic prosperity"

Ottawafestes (n.d)



A Brief History



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Before modern technologies

Trains have been a popular form of transportation since the 19th century. When the first steam train was built in 1804, people were worried that the speed would make rail passengers unable to breathe or that they would be shaken unconscious by the vibrations.

DKfindout (2021)

When Englishman Richard Trevithick launched the first practical steam locomotive in 1804, it averaged less than 10 mph. Today, several high-speed rail lines are regularly travelling 30 times as fast.

Museum Wales (2008)



How much have trains advanced?

- Logo
- Speed
- Catering
- Facilities (toilets)
- Comfort
- Plugs





Challenges before modern technology in nation railways.

By Vladimir Totev

Challenges before introducing Modern Technology

- Long queue - passengers get agitated in a long wait due to human service
- Paperwork – filling forms, too much paperwork
- No notifications – passengers don't get promotional alerts from station posters
- 21 days refund policy – waiting for the refund payment to come through
- National Rail (2020)



Nowadays Nation railways

- Rail supports growth in two ways: the significant levels of infrastructure investment creates an initial stimulus to economic output but, more significantly, the provision of efficient and high-quality rail transport for both people and freight supports growth across the rest of the economy.
- - Passenger numbers and freight traffic have both grown substantially since the mid-1990s, against the expectations at the time. More people across the country are using the railway now than ever before, as the market-base for rail expands.
 - The UK now has the most intensively used network in Europe. Growth is forecast to continue, with a 14% increase in passenger demand and 22% growth in freight tonnage over the next five years.
- Office of Rail regulation (2013)



- • Passenger satisfaction is today at near-record levels. A recent EU report said that the UK had the most improved railway for passenger satisfaction over the last decade.
- • The recent health and safety record of the railways has been good and is now among the best in Europe.
- • As the health and safety authority for the railway, ORR's strategy is to enforce the law and ensure that the industry delivers continuous improvement in the health and safety of passengers, the workforce and public, by achieving excellence in health and safety culture, management and risk control.
- Office of Rail Regulations (2013)



- 1 - Digital railway

Siemens mobility and Atkins will be crucial in carrying out the East Coast Digital Program (ECDP). The government's initial £350 million investment in the ECDP is now being used to start implementing real-time digital signaling on the route and lay the groundwork for a larger national roll-out. The ECDP will be the first intercity digital railway in Britain, fitting trains with the latest in-cab signaling technology and removing the old lineside signals. It will mean that signalers will be able to communicate to trains continuously rather than only at fixed points, instructing and responding in real time and reducing delays and significantly improving performance.

- 2 - Traffic management tech reduces delays

- Every day, the Thales ARAMIS system assists over 300 trains. It provides real-time enhanced data to operators, flags potential conflicts, and assists in training running controllers to manage services proactively. It reduces the knock-on delays that can cause widespread disruption after an incident and allows for real-time re-planning, allowing services to quickly resume normal operations.

- 3 - Cats create new algorithm for safer railway

- A new algorithm, combining track circuit and signal berth data to more accurately identify a train's location at any given time, was the winning entry at this year's HackTrain VI event - powered by [Hack Partners](#) and Network Rail.

- The solution - created by CodingCats - found spare capacity in parts of the rail network, providing opportunities for more accurate timetabling and improvements in the operation of the railway.

- Network Rail (2020).



Insight of modern technology introduced

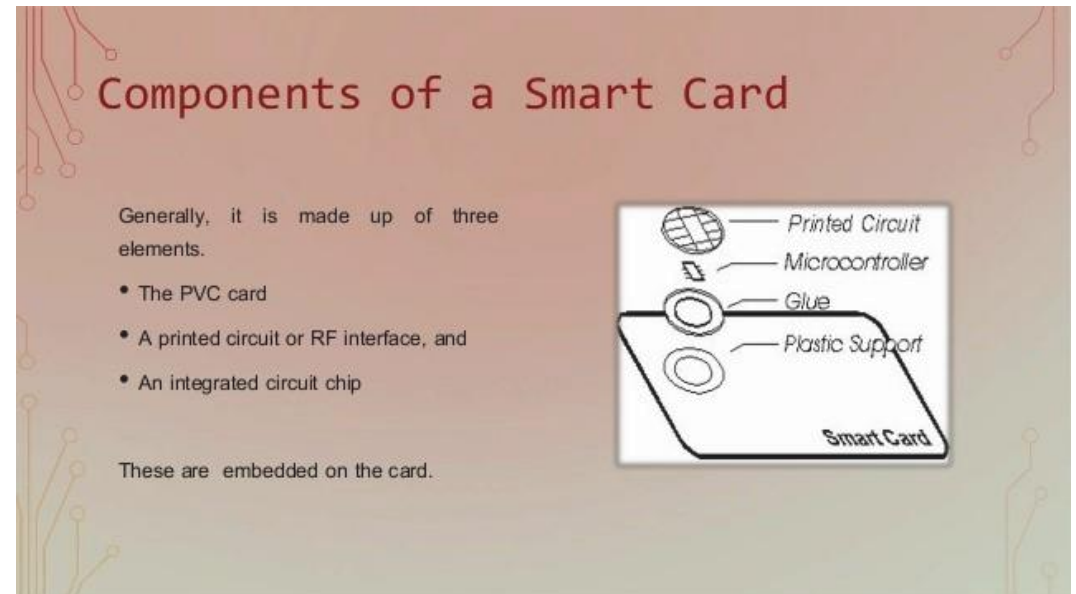
- National Rail smart card is a credit card size electronic ticket that stores rail tickets on a microchip and is used to tap in and out of stations. Search security (2020).



Components: it is made up of three elements.

1. The pvc card
2. A printed circuit or RF interface
3. Integrated circuit chip.

Search security (2020).



How does it work? The card connects to a reader with direct physical contact or with a remote contactless radio frequency interface.

- **Benefit of the technology.**
- store much more information that can be stored on a magnetic stripe card.
- Persistent, protected storage.
- Packaging, usually made of plastic.
- **National rail(2020).**

Time to switch to smart tickets



Intelligence tasks it can perform that differs from others.

It's time to say goodbye
to your paper ticket.

Switch to smart tickets.



Secure: never loss ticket, safely and digitally.

Manageable: user can buy, change, track spending and store receipts.

Access easily: access tickets online and on the go from anywhere at any time.

Rewarding: enables customer notifications and delay compensation.

Time saving: skip the queue, save time and head straight to the train.

National rail(2020).

Impact Of Modern Technology

Modern technology has made being 'connected' a lot easier and having constant access to digital services has become an essential part of everyday life.

The modernisation of the National Rail is very extensive, but in this presentation we will be looking at :

Wi-Fi & Smart Card

National Rail Enquired (2019)

I invite you to watch this video to understand better how the smart card works and the benefits of it:



Positive Impact

1.No need to collect your ticket

2. Save time when travelling

3. Durable / Efficient

4. Protection against loss and theft

5. Automatic reimbursements for delays

Paragon Group Limited (2021)

Sampson D. (2018)



Figure 11: Benefits quantified to date in case studies

Negative Impacts

- **Negative Impact:**

- **Wi-Fi**

- Slower services
- Disruptions: signal failure, overrunning engineering works.
- It is true that regarding rail and public transport despite the rise of Wi-Fi hotspots and mobile data, millions of passengers are disappointed by the poor services.

- **Malfunctions and Errors of Smart Card**

- There are times when you swipe your card and it doesn't work. This could be attributed to two causes: either your credit magnetic card stripe has been erased, or it's dirty and/or scratched.
- Erasure typically stems from contact with, or exposure to, magnets. It's not possible for you to fix this, so you might have to get your card replaced.
- Sampsom D.(2018)



Leeson drawn from the case study

- **Smart cards are:**
 - **Time saving**
 - **No queues**
 - **Durable / Efficient**
 - **Discounted price compared with paper tickets (72%)**
 - **Automatic refunds for service delays and cancellations (72%)**
 - **Automatic calculation for capped fares so you always pay the lowest (71%)**
 - **Ability to use smart ticketing products across all modes of transport (63%)**
- (Opinium, 2018)



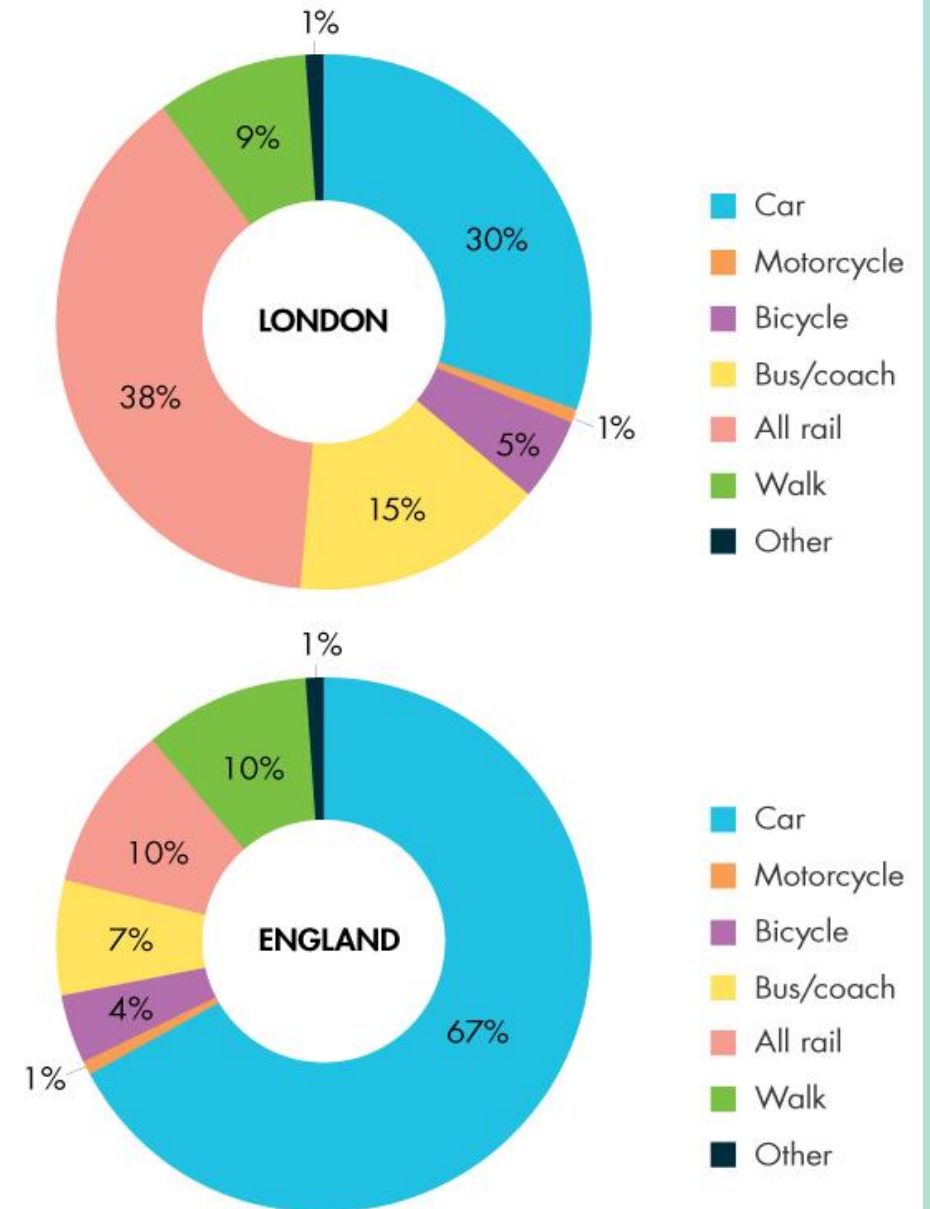
Conclusion

- Most Railcards can be purchased online
- Digital Railcard to your smartphone
- Device with Railcard App
- Can be purchased at any National Rail staffed ticket office
- Railcard (n.d.)



Rail travel

- Car was the most common mode of transport, but travel by rail has increased the fastest since 2002
- Rail demand has more than doubled since rail privatisation in 1994/95
- Rail travel is highest in London and the South East
- CBRE (n.d.).
- Gov.uk (2020).



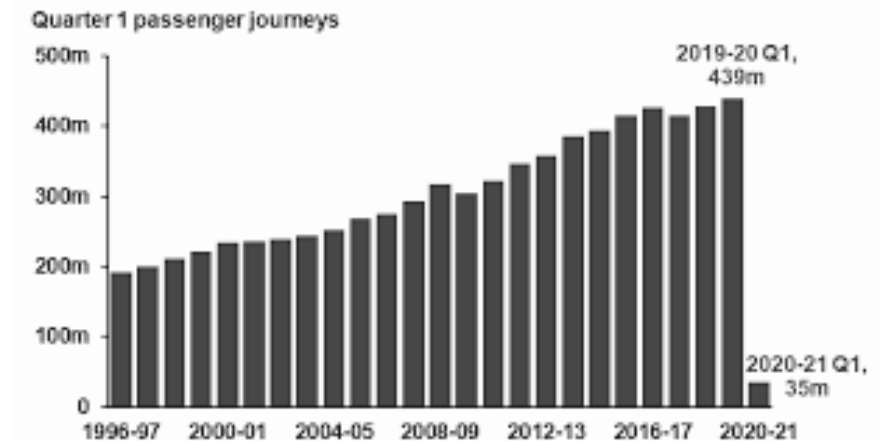
Passenger experience

The proportion of train journeys rated as satisfactory was higher than for car journeys

Rail remains one of the safest modes of transport

Government funding of rail has increased

ORR (2020) .
Gov.uk (2020).



Railcards

16-17 Saver

£30/y

16-25 Railcard

£30/y

26-30 Railcard

£30/y

Disabled Persons Railcard

£20/y

Family & Friends Railcard

£30/y

Network Railcard

£30/y

Senior Railcard

£30/y

Two Together Railcard

£30/y

Veterans Railcard

£30/y

Railcard (n.d.).



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